**CSC415 OPERATING SYSTEM PRINCIPLES**

**Homework 1**

1. What is the difference between symmetric multiprocessing and asymmetric multiprocessing? (10 Points)
2. Why do user programs have to make system calls rather than just executing the code for the system calls themselves? (10 Points)
3. What are the four sections in the address space of a process? What is the Process Control Block? (10 Points)
4. Assuming there are no errors, how many NEW processes will the following code create? Why? (10 Points)

if (!fork())

fork();

else {

fork();

fork();

}

1. Describe the actions taken by a kernel to context-switch between processes? (10 Points)
2. What are the two models for Inter-Process Communication? What are their differences? (10 Points)
3. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds: (40 Points)

Process Burst Time Priority

*P*1 10 3

*P*2 1 1

*P*3 2 3

*P*4 1 4

*P*5 5 2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

1. Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a nonpreemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.
2. What is the turnaround time of each process for each of the scheduling algorithms in Part a?
3. What is the waiting time of each process for each of the scheduling algorithms Part a?
4. What is the average waiting time for each of the scheduling algorithms in Part a?